Aquifer Management & Underground Injection
February 9-11, 2015
Austin, TX – Radisson Hotel & Suites Downtown
Register at www.gwpc.org

Sessions: Monday: 10:00a-5:00p & 5:30 Reception
Tuesday: 8:00a-5:00p
Wednesday: 8:00a-4:00p

Draft Preliminary Agenda – GWPC UIC Conference Austin, TX – Feb. 9-11, 2015 *(specifics subject to changes)*

Monday February 9, 2015			
10:00-5:00 - open *Well Integrity Workshop* Abstract	12:30-3:00 - closed *Induced Seismicity Working Group Meeting*	3:30-5:30 - closed *FracFocus Working Group Meeting*	3:30-5:30 - closed *UIC National Technical Workgroup*
5:30-7:00 *The 20th Annual GWPC UIC Conference Reception*			

Tuesday, February 10, 2015	
8:00-10:00	*Evolution of the UIC Program -- Over 3 decades of a effective waste management and environmental protection* Leslie Savage – GWPC President & Railroad Commission of Texas (Panel) Dale Kohler – Texas Commission on Environmental Quality (Moderator) Bruce Kobelski – USEPA Office of Ground Water and Drinking Water Bob VanVoorhees – Underground Injection Technology Council John Veil, Veil Environmental - New Information on Produced Water Volumes and Management Practices Bill Rish, Hull Risk Analysis Center - EVERYTHING OLD IS NEW AGAIN: 40 Years of Assessing Risks of Underground Injection of Waste *Abstract*
10:00-	Break
10:20- 12:20	*Induced Seismicity by Underground Injection* Glen Brown - Continental Resources Phillip Dellinger – USEPA Region 6 A Proactive Approach to Induced Seismicity: Can the Oil and Gas Industry Manage Induced Seismicity and Work in Cooperation With the Regulatory Agencies? - Thomas E. Tomastik, and J. Daniel Arthur, ALL Consulting *Abstract* Rick Simmers – Ohio Oil Department of Natural Resources, Oil and Gas Division
12:20-1:30	*The 20th Annual GWPC UIC Conference Luncheon* Peter Grevatt, PhD, Director USEPA Director of Office of Groundwater & Drinking Water Leslie Savage – GWPC President & Railroad Commission of Texas

Tuesday, February 10, 2015 (continued)		
1:40-3:40	*Oil & Natural Gas Water Management* **Joe Lee**, PA DEP, O&G Division (moderator) Brine Disposal Reservoirs in the Appalachian Basin: Injection Performance and Geological Properties - **Joel Sminchak**, John Miller, and Neeraj Gupta. Battelle, Columbus, Ohio *Abstract* New Information on Produced Water Volumes and Management Practices - **John Veil**, Veil Environmental *Abstract* Shale Energy Produced Fluids Management and UIC Well Disposal Trends - **David Yoxtheimer**, Penn State University Class II Saltwater Disposal Wells in Ohio: Understanding the Avenue to Success - **J. Daniel Arthur**, Thomas E. Tomastik, and David Overstreet, ALL Consulting *Abstract* Dual Permitting of Class II and Class V Wells for the Injection of Drinking Water Treatment Residual Wastewaters - **Phil Dellinger**, EPA Region 6, **Tim Baker**, Oil and Gas Director, OK Corporation Commission, and **Saba Tahmassebi**, OK DEQ	
3:40-	Break	
4:00-6:00	*State/EPA UIC Issues Roundtable* (State & EPA Only)	*Industry Issues Roundtable*

Wednesday, February 11, 2015	
	Managed Aquifer Recharge
8:20-9:00	Examples of Managed Aquifer Recharge in New Mexico - **Bill Marley**, Daniel B. Stephens & Associates, Inc. *Abstract*
	Aquifer Exemptions
9:00-9:40	**Peter Grevatt**, PhD, Director USEPA Director of Office of Groundwater & Drinking Water to provide education and outreach regarding aquifer exemptions to the regions, states and the regulated community on the record of decision memo/document checklist that will be used by the regions to document aquifer exemption decisions.
9:40-10:00	**Bob VanVoorhees**, UITC to discuss the legal aspects/evolution of the Aquifer Exemption concept, including the origin/need for Aquifer Exemptions, the initial AE approvals as part of the program delegation process, the program modification process, and key definitions such as the evolution of USDW concept, current and future use, etc.
10:00-12:00	Panel discussion of various viewpoints/ perspectives on aquifer exemptions. - USEPA Region representative – **Kurt Hildebrandt**, USEPA Region 7 - State program with Class II delegation – **Leslie Savage**, Railroad Commission of Texas - State program with delegation for Classes (I, III, V, and VI) – **Dale Kohler**, TCEQ - Drinking water representative – **Fred Aus**, TX Rural Water Association - Class II Operator - TBA - Class III Operator – **Mark Pelizza**, Uranium Resources, Inc. - Environmental NGO - **Lynn Thorp**, Clean Water Action
12:00-1:20	Lunch on your own

Wednesday, February 11, 2015 (continued)	
1:20-4:00	*Oil and Natural Gas Environmental* Quality and Age of Shallow Groundwater in the Bakken Formation Production Area, Williston Basin, Montana and North Dakota - **Peter McMahon**, USGS State Oil & Gas Regulations Designed to Protect Water Resources: Reflecting the Continuing Progress of States – **Mike Nickolaus**, GWPC Methane Occurrence and Water-Quality Characteristics Found in Groundwater of the Appalachian Basin – **Bert Smith**, Chesapeake Energy *Abstract* Smart-Monitoring to Address Risks of Unconventional Gas Development - **Jon Fennell**, Integrated Sustainability Consultants Ltd. *Abstract* Stray Gas Case Study – **Fred Baldassare**, Echelon RBDMS, FracFocus, The National Oil and Gas Gateway, Water Tracker, and the Wellfinder APP: Providing the tools to access information on oil, gas and UIC activities **Paul Jehn**, GWPC

For further information contact: Ben Grunewald at (405)516-4972 and ben@gwpc.org

Abstract

LIFE CYCLE WELLBORE INTEGRITY – DRILING, STIMULATION, PRODUCTION WORKSHOP

This course will focus on two critical components of wellbore integrity – CASING DESIGN and CEMENTING. Key aspects of casing design will be discussed so that course attendees will gain a firm understanding of why a good casing design is critical to ensure that the well retains its structural integrity throughout its life cycle. The importance of obtaining a good primary cement job also will be covered, including good cementing practices and evaluation utilizing current cement bond logging techniques – ultra sonic imaging tool (USIT), circumferential acoustic scanning tool (CAST) and segmented bond tool (SBT) – in addition to conventional CBL/VDL techniques.

Although the types of wells that will be covered are primarily oil and gas production and injection wells (water-flood, EOR, CO2 and WAG – water-alternating gas wells) the casing design and cementing principles are equally applicable to Class I and II disposal wells. Well integrity considerations for hydraulically fractured wells also will be covered. However, it is not a primary objective of this course to have attendees become experts in casing design and cementing, or in the interpretation of cement bond logging techniques. Rather, the objective is to enable them to have a strong and clear understanding of these two critical well integrity components

TOPICS COVERED

- Well Integrity – Definition and why Well Integrity is Important
- Basic Well Construction and Completion Principles
- Well Integrity – Barriers and Philosophy
- Well Integrity – Issues and Challenges
- Basic Casing Design Principles
- Casing Design Example Problems
- Casing Design Considerations for HP/HT, ERD and HF wells
- Casing Failure Examples: Multi-Stage HF wells
- Cementing and Squeeze Cementing
- Evaluation of Cement Job/Quality/Bond Logs
- Current CBL Techniques/USIT/CAST-V/SBT/Isolation Scanner
- Review of Macondo Blowout
- Wellbore/Mechanical Integrity Testing Methods
- Hydraulic Fracturing and Drinking Water Issues
- Selected Well Integrity Cases from Shale Reservoirs
- National and Regional/State Perspectives
- Q&As, Summary and wrap-up

ABOUT THE INSTRUCTOR

Talib Syed, P.E. holds a B-Tech (Chemical Engineering – Univ. of Madras, India) and an M.S. in Petroleum Engineering (Univ. of Oklahoma) and is a Registered Professional Petroleum Engineer in CO and WY and a member of SPE (since 1977) and AIME. He has more than 38 years of domestic and international experience in oil and gas production operations (both offshore and onshore) and in well integrity projects in some of the largest oilfields in the world (Saudi Arabia – Ghawar/Safaniya and Alaskan North Slope). His current areas of interest include well integrity projects, CO2 – EOR and CO2-GS, slurry fracture injection, and hydraulic fracturing of tight oil and gas reservoirs (drilling and completion).

PROFESSIONAL DEVELOPMENT HOURS CREDITS

A total of 8 hours of Profession Development Hours will be noted in a certificate that will be made available to each participant.

Abstract

New Information on Produced Water Volumes and Management Practices

John Veil – Veil Environmental, LLC

Abstract In 2009, Argonne National Laboratory published a report that estimated produced water volumes from all oil and gas wells in the United States during 2007 (21 billion bbl) and gave general trends on how the produced water was managed (nearly all onshore produced water is reinjected, and nearly all offshore produced water is treated and discharged). That report (Clark and Veil, 2009) has been cited thousands of times.

That information is now more than five years old. Since 2007, the U.S. oil and gas industry has changed dramatically with the rapid expansion of unconventional oil and gas production. Unconventional production was not a large percentage of total national production in 2007, whereas in 2012 unconventional production was considerably higher. The total volumes and changes over time in water production profiles are generally different for conventional wells and unconventional wells. Therefore, the data from 2012 may be different from data from 2007.

This presentation describes the approach used to collect data, the results of both the produced water generation volume estimate and how the produced water was managed in 2012, and the assumptions, caveats, estsimation and extrapolation approaches used to fill gaps in the data.

John Veil is the President of Veil Environmental, LLC, which he founded upon his retirement from Argonne National Laboratory in 2011. Veil has published numerous reports on produced water and has lectured around the world on water and energy subjects. He holds degrees in Earth and Planetary Science, Zoology, and Civil Engineering. He is also an avid saltwater fisherman.

Abstract

EVERYTHING OLD IS NEW AGAIN: 40 Years of Assessing Risks of Underground Injection of Waste

William Rish Ph.D., Hull Risk Analysis Center

Dr. Rish directs the Hull Risk Analysis Center, a team of experts that apply science and communication skills to support risk-based decisions. In the late 1990's, Bill prepared a risk analysis that was included in USEPA's 2001 study of the risks associated with Class I underground injection wells He is currently serving as chair of the Marcellus Shale Coalition work group on hydraulic fracturing risks and as a member of the GWPC/SOGRE work group on induced seismicity. Bill earned his doctorate in Engineering and Public Policy from Carnegie-Mellon University.

Abstract

In 1974, responding to concerns about underground injection practices, EPA issued a policy statement asking for "strict control and clear demonstration that such wastes will not interfere with present or potential use of subsurface water supplies, contaminate interconnected surface waters or otherwise damage the environment." This presentation summarizes the past 40 years of assessments of risk associated with underground injection of waste. The latest new risk issues and perceptions are also discussed.

Abstract

A Proactive Approach to Induced Seismicity: Can the Oil and Gas Industry Manage Induced Seismicity and Work in Cooperation With the Regulatory Agencies?

Thomas E. Tomastik, Senior Geologist and Regulatory Specialist, ALL Consulting
and J. Daniel Arthur, P.E., SPEC, ALL Consulting

Allegations of induced seismicity associated with the oil and gas industry has become a national issue in the United States. Many states, including Arkansas, Kansas, Ohio, Oklahoma, and Texas, have developed or are developing regulations to address concerns regarding alleged induced seismicity related to oil and gas development. The main focus has been directed at Class II saltwater disposal operations (SWD). The term "induced seismicity" is defined as earthquake events associated with man-made activities such as: surface and underground mining, geothermal energy, oil and gas operations, dams and artificial lakes, underground nuclear tests, groundwater extraction, and underground injection. The first documented case of induced seismicity occurred at a dam/reservoir in Algeria in 1932. Seismic events associated with oil and gas activities and injection wells were well documented in the early 1960s in Colorado at the Rocky Mountain Arsenal and at the Rangely Oilfield. The United States Geological Survey (USGS) believes the rise in seismicity in the central and eastern United States since 2009 coincided with increased injection activities in Arkansas, Colorado, Ohio, Oklahoma, and Texas. The USGS believes induced seismicity related to the energy industry occurs when there is a change in pore pressure or a change in stress, or both, near faults that are stable, but under critical stress.

In response to the growing concerns of induced seismicity related to the oil and gas industry, two workgroups were formed to better understand seismicity related to SWDs, share data and experiences, and review case studies. The U.S. EPA UIC National Technical Work Group, which is comprised of U.S. EPA UIC staff from ten regions and headquarters and UIC regulators from six states, formed a subgroup in June of 2011 to initiate a study of Class II injection wells and induced seismicity. This report has been written, peer reviewed, and is awaiting final release by the U.S. EPA. The second workgroup, Induced Seismicity by Injection, was formed in early 2014 and this workgroup includes 13 states, oil and gas industry representatives, environmental groups, and the scientific community. Additional discussions within these work groups have centered on the development of a regulatory decision model and a traffic light system to address induced seismicity.

Since 2012, the Ohio Department of Natural Resources, Division of Oil and Gas Resources Management (DOGRM) has been proactively approaching the issue of induced seismicity associated with oil and gas development.. DOGRM is now monitoring in real-time 30 portable seismic stations (19 of their own and 11 managed by the oil and gas industry) and has access to the 53 USGS TA regional stations through the Earthworm system. ALL Consulting, LLC is also proactively approaching induced seismicity and is actively involved in seismic unit installation and monitoring for oil and gas clients in Ohio and in other oil and gas producing states.

Even though induced seismicity related to the oil and gas activity is rare, it is a nationwide issue and is not going away anytime soon. It is crucial for the oil and gas industry to approach induced seismicity proactively with sound science and work in cooperation with regulatory agencies to address the issue of induced seismicity.

Abstract

Implementation of Managed Aquifer Recharge Systems in New Mexico

Robert Marley, Senior Hydrogeologist
Daniel B. Stephens & Associates, Inc.

Bob Marley is a Senior Hydrogeologist at Daniel B. Stephens & Associates. He received his B.S. in Geology from Northern Arizona University and M.S. in Hydrology from the University of Arizona. His work focuses on development of alternate water sources, water reuse applications, and water treatment. His efforts include implementation of managed aquifer recharge (MAR) and aquifer storage and recovery (ASR) programs within New Mexico for Rio Rancho, Las Vegas (NM), U.S. Bureau of Reclamation, and the Albuquerque Bernalillo County Water Utility Authority.

New Mexico water providers have consistently identified managed aquifer recharge (MAR) as an important tool for conjunctive management of surface-water, groundwater, and reclaimed water sources. The overarching goals are to improve water supply reliability and long-term sustainability. Potential water sources available for recharge operations include inter-basin transferred surface water, storm water, and highly treated reclaimed wastewater sources that can require minor to extensive treatment pre-recharge and post-recovery. So far MAR systems have been slow to take root in the state partly due to rigorous demonstration requirements, groundwater quality protection concerns, and ongoing water right uncertainties. This presentation will highlight efforts of multiple water providers to develop MAR systems and describe ongoing technical, financial, and regulatory challenges for large-scale implementation.

Abstract

Class II Saltwater Disposal Wells in Ohio: Understanding the Avenue to Success

J. Daniel Arthur, P.E., SPEC, President, ALL Consulting;
Thomas E. Tomastik, Geologist, ALL Consulting; and David Overstreet, Vice-President, ALL Consulting

The rapid development of oil and natural gas resources from the Marcellus and Utica shales has led to a big demand for Class II disposal of oilfield fluid wastes in the Appalachian Basin. With the small number of Class II disposal wells and lack of primacy in Pennsylvania and New York and the limited number of commercial Class II disposal wells in West Virginia, only Ohio remains as being well suited to handle the increase in Class II saltwater disposal well activity in the Appalachian Basin area.

Ohio received primacy of its Class II program from U.S. EPA in 1983 and has seen a dramatic rise in Class II disposal well applications since 2010. Ohio currently has 237 Class II disposal wells permitted and has injected over 16,000,000 barrels through the third quarter of 2014, with most of the increase coming from the development of the Utica-Point Pleasant play in Ohio. Along with this big increase in disposal wells and injection volumes, Ohio has seen a renewed rise in environmental activism, has dealt with induced seismicity related to Class II injection, and has passed new regulations addressing well construction, injection well testing, and seismic monitoring.

The challenges facing injection well applicants and operators in Ohio can be overwhelming. These challenges include: Finding and locating open spaces for siting of injection wells; conducting title searches and addressing mineral rights issues; dealing with areas of dense population; addressing public and local political activists opposed to injection well development; finding adequate geologic formations for high capacity disposal operations; understanding proper well construction, cementing, and completion methodology; selecting the right option for surface facility development and pre-treatment programs; dealing with TENORM testing and solid waste disposal issues; and working with the regulatory agency on seismic unit installation and monitoring requirements.

Proper consideration of all of these challenges can lead to the successful permitting, drilling, construction, completion, and operation of a commercial Class II saltwater disposal facility in Ohio. ALL Consulting is actively engaged in assisting oil and gas clients in Ohio by understanding how to maneuver in the disposal well landscape and how to address these challenges. This presentation will explore the challenges faced by an Ohio applicant or operator and provide solutions to addressing the issues.

Abstract

Methane Occurrence and Water-Quality Characteristics Found in Groundwater of the Appalachian Basin

Bert Smith, Chesapeake Energy

Abstract: Review of analytical data from over 19,000 pre-drill groundwater samples collected on behalf of Chesapeake Energy Corporation from water wells in the Appalachian Basin indicates that methane is found naturally and is essentially ubiquitous in groundwater of the Appalachian Basin. The occurrence of methane is controlled by the water-bearing geological unit penetrated by the water well, the hydrochemical facies (e.g. Na-Cl, Na-HCO_3, or Ca-HCO_3 groundwater type), whether the well is located in a valley or an upland location, and whether the water well intersects restricted or confined saline zones. Methane gas can occasionally be found in the water well annular headspace and is often associated with draw-down based on water-well usage. No evidence was found that dissolved methane in groundwater occurs at higher concentrations in closer proximity to oil or gas wells. Chesapeake's dataset also shows natural pre-drilling exceedances of water-quality standards (excluding turbidity) occur in 62.1% of water well samples in NE Pennsylvania and 87.3% in a Western Area of the Appalachian Basin(Eastern Ohio, Northern West Virginia, and SW Pennsylvania).

Bert Smith has over 35 years of experience as a hydrogeologist and works for the EnviroClean Group, an oil-field consulting and remediation company. He has a BS Degree in Geology and an MS Degree in Engineering from Washington State University. Mr. Smith has been responsible for coordinating the evaluation of Chesapeake's pre-drilling water quality data collected in the Appalachian Basin.

Abstract

Brine Disposal Reservoirs in the Appalachian Basin:Injection Performance and Geological Properties

Joel Sminchak, John Miller, and Neeraj Gupta Battelle

Many different reservoirs are utilized for Class II brine disposal in the Appalachian Basin. Understanding the geology and injection well operational history of these zones may be used to support safe, reliable, and environmentally responsible brine disposal in the region. For the purposes of the research, the study area was defined as eastern Kentucky, Ohio, Pennsylvania, and West Virginia. Brine injection in the study area has increased from approximately 6-7 million barrels per year in the early 2000s to 17.6 million barrels in 2012, mostly due to shale gas activity. To define geologic properties of injection zones, 690 geophysical well logs from injection wells were analyzed. In addition, local-scale geocellular models were developed for several key injection zones. Operational data on injection rates and pressures were compiled for 2008-2012 for over 200 Class II brine disposal wells. Several Class II brine disposal wells were monitored with continuous wellhead pressure loggers to estimate reservoir permeability from pressure fall-off cycles. Geomechanical analysis was also completed to determine the potential for injection induce fracturing in the subsurface. Project results provide a catalog of injection rates for the various formations, which range from 100s of barrels per month to more than 100,000 barrels per month. Some reservoirs exhibit geologic boundaries which appear to limit long-term injection as reflected in operational data. Injection simulations suggest there is little potential for long-term migration of brine due to low permeability of the reservoirs and relatively minor contrast in density of formation and injection fluids. This project was supported by the Research Partnership to Secure Energy for America unconventional onshore program project #11122-73.

Joel Sminchak works in the Energy and Environment department at Battelle Memorial Research Institute. He has been active in research on hydrogeologic, engineering, regulatory, and risk issues associated with the deep-well injection for enhanced oil recovery, CO_2 storage, and brine disposal.

Abstract

Smart-monitoring to address risks of unconventional gas development

Jon Fennell, M.Sc., Ph.D., P.Geol., Integrated Sustainability Consultants Ltd.

Given our current knowledge and innovative technologies, North America is well placed to move the emerging unconventional gas (UCG) sector forward. Given the trillions of cubic feet of shale and tight gas beneath Canada and the United States, development of these resources will generate significant economic benefit to our countries and provide a clean energy source for end users. On the other hand, concern is mounting regarding the potential impacts of such development (and the associated hydraulic fracturing activities) on potable groundwater resources and connected systems. The Government of Alberta has recognized this concern, and responded in kind by working to enhance the provincial groundwater observation well network in active and future development areas. This presentation will showcase a multi-attribute risk analysis approach designed to assess subsurface risk and surface access opportunities, with the goal of identifying optimal monitoring locations across broad development areas to define baseline groundwater conditions and detect any changes resulting from UCG development activities.